

## An Introduction to Research for Science Communicators

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### Abstract:

The perceived complexity of scientific concepts often makes them difficult to convey in simple terms. This complexity can lead to misunderstandings and misconceptions among the general public and scientist. Additionally, there is a significant gap between the language used in scientific literature and everyday language, which can create barriers to comprehension. Simplifying scientific information without losing accuracy is a challenge, as it requires balancing clarity with the need to retain the essential details and nuances of the research.

This paper was written as an introduction to research for Science Communicators. The paper includes how academia is set up, a crash course in Digital object identifiers (DOI), Levels of Evidence, the use of scihub, a proposed mindset for science communication, and finally a step by step for research.

Sharing scientific knowledge is a process. Perceived complexities of scientific concepts can make them hard to explain clearly. This complexity can result in misunderstandings and misconceptions among both the public and scientists. A significant divide exists between the language used in scientific literature and everyday language, creating comprehension barriers. Translating scientific information into simple terms, while preserving accuracy, is challenging. It involves striking a balance between clarity and the need to maintain the crucial details and subtleties of the research.

### How the Academic System is Set Up

The academic system is structured around research institutions, universities, and scholarly communities dedicated to advancing knowledge. Researchers conduct studies, experiments, and analyses to contribute to their fields. The process of conducting and publishing research involves several stages, including hypothesis formation, data collection, analysis, and peer review.

Peer review is a critical component of the academic process, ensuring that research is evaluated by experts in the field before publication. Academic journals play a central role in disseminating research findings, and their impact factors indicate the influence and credibility of the publications. Conferences and symposia provide

platforms for researchers to present their work, share ideas, and collaborate with peers.

## What “DOIs” Are

A Digital Object Identifier (DOI) is a unique alphanumeric string assigned to digital content, such as journal articles, to provide a permanent link to its location on the internet. DOIs ensure that even if the web address of the content changes, the DOI will always direct users to the material. This permanence is crucial for citation and referencing in academic work, as it maintains the accessibility and integrity of sources.

DOIs are important for citing and accessing research because they offer a reliable way to locate and verify academic papers. Researchers and readers can use DOIs to quickly find the original sources, ensuring that their references are accurate and up-to-date.

## Levels of Evidence

Understanding the levels of evidence is essential for evaluating the credibility and reliability of research findings. The hierarchy of evidence includes:

- Systematic reviews and meta-analyses: These studies compile and analyze data from multiple studies to provide comprehensive conclusions.
- Randomized controlled trials (RCTs): These experiments randomly assign participants to different groups to test the effects of interventions.
- Cohort studies: These observational studies follow groups of people over time to assess the impact of various factors on outcomes.
- Case-control studies: These studies compare individuals with a specific condition to those without it to identify potential causes or risk factors.
- Cross-sectional studies: These studies analyze data from a specific point in time to identify patterns and correlations.
- Case reports and case series: These studies provide detailed descriptions of individual or group cases, often highlighting novel occurrences.
- Expert opinions and editorials: These articles provide insights and perspectives from experienced researchers but are considered less reliable than empirical studies.

## Sci-Hub

Video: <https://www.youtube.com/watch?v=PriwCi6SzLo>

Sci-Hub is a website that provides free access to millions of research papers by bypassing publishers' paywalls. It was created to promote open access to scientific knowledge.

The ethics of using such information is complicated. I have provided a video from a doctor that goes over such things.



You Will Always Be a Little Wrong, and That's Okay!

Science is an evolving field where knowledge is continually refined and updated. As a result, it's important to acknowledge that scientific understanding is never absolute and can always be improved. Embracing the idea that you will always be a little wrong is crucial for growth and progress.

Acknowledging and learning from mistakes is a fundamental aspect of scientific inquiry. Scientific progress is built on the refinement and correction of previous work. This iterative process drives innovation and discovery. Encouraging a mindset of uncertainty and continual learning helps researchers stay open to new ideas and advancements.

How to read a study effectively:

Most papers are set up in 6 sections. Them being,

**Abstract:** A brief summary (150-250 words) of the paper's main arguments, methodology, and conclusions.

**Introduction:** Provides context, background information, and a clear thesis statement that outlines the paper's central argument.

**Method/Body:** Divided into sections or chapters, each focusing on a specific aspect of the research or topic. This is where the author presents their findings, analysis, and evidence.

**Conclusion:** Summarizes the main points, reiterates the thesis, and provides a final thought or recommendation.

**References:** A list of sources cited in the paper, formatted according to the chosen citation style (e.g., MLA, APA, Chicago).

Effective research involves several key steps:

- **Developing a research question or hypothesis:** Start with a clear and focused question or hypothesis that guides your investigation.
- **Identifying reliable sources of information:** Use reputable databases, journals, and institutions to find high-quality research.
- **Using databases and search engines efficiently:** Familiarize yourself with academic databases like PubMed, Google Scholar, and others to locate relevant studies.
- **Evaluating the credibility and relevance of sources:** Assess the validity, reliability, and relevance of the sources you find. Consider the study design, sample size, and potential biases.
- **Taking notes and organizing information:** Keep detailed notes and organize your information systematically. This helps in synthesizing data and drawing meaningful conclusions.
- **Synthesizing information and drawing conclusions:** Integrate findings from multiple sources to develop a comprehensive understanding of the topic. Analyze the data critically to draw well-supported conclusions.
- **The importance of critical thinking and skepticism:** Maintain a critical and skeptical mindset. Question assumptions, evaluate evidence rigorously, and be open to revising your views based on new information.